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Declaration for the Record of Decision Amendment

Site Name and Location

Environmental Conservation and Chemical Corporation, Zionsville, Indiana

Statement of Basis and Purpose

This decision document, together with a Record of Decision dated September 25, 1987, represents the selected remedial action for the Environmental Conservation and Chemical Corporation site developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based on the contents of the administrative record for the Environmental Conservation and Chemical Corporation site. The attached index identifies the items which comprise the administrative record upon which the decision to amend the 1987 Record of Decision, and the selection of the modified remedial action is based.

The State of Indiana concurs in the remedy selected by U.S. EPA for the Environmental Conservation and Chemical Corporation site.

Description of the Remedy

The primary reason for amending the 1987 Record of Decision is to reflect the decision to implement separate, complementary remedies for the Environmental Conservation and Chemical Corporation and Northside Sanitary Landfill sites, instead of the one combined remedy selected in the 1987 Record of Decision, and secondarily, to modify the selected remedy.

For the Environmental Conservation and Chemical Corporation site, the major components of the remedial action, as modified, include:

- Soil vapor extraction, concentration and destruction
- RCRA Subtitle C cap
- Access restrictions
- Subsurface and surface water monitoring
- Contingent subsurface water collection and treatment

Declaration

The selected remedy, as modified herein, is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost-effective.

This remedy satisfies the statutory preference for remedies that employ treatment that reduce toxicity, mobility or volume as a principal element and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable.

Because this remedy will result in hazardous substances remaining on-site, pursuant to Section 121(c) of CERCLA, a review will be conducted at the site within five years after commencement of the remedial action and at least every five years thereafter to ensure that the remedy continues to provide adequate protection of human health and the environment.

June 7th, 1991.
Date

Valdas V. Adamkus
Valdas V. Adamkus
Regional Administrator
Region V

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

Site: Environmental Conservation and Chemical Corporation, and Northside Sanitary Landfill, Zionsville, Indiana

Documents Reviewed

The following documents, which describe the physical characteristics of the Environmental Conservation and Chemical Corporation, also referred to as the Enviro-Chem Corporation, or ECC, and Northside Sanitary Landfill (NSL) sites, and which analyze the cost-effectiveness of various remedial alternatives, have been reviewed by U.S. EPA and form the basis for this Record of Decision (ROD):

- "Remedial Investigation Report, ECC Site", CH_2M Hill, March 14, 1986.
- "Remedial Investigation Report, Northside Sanitary Landfill," CH_2M Hill, March 27, 1986, as amended on June 18, 1986.
- "Feasibility Study, ECC Site", CH_2M Hill, December 5, 1986.
- "Feasibility Study, Northside Sanitary Landfill", CH_2M Hill December 5, 1986.
- "Combined Alternatives Analysis Report, Northside Sanitary Landfill and Environmental Conservation and Chemical Corporation", CH_2M Hill, December 5, 1986.
- Summary of Remedial Alternative Selection.
- Community Relations Responsiveness Summary.
- Partial Consent Decree, dated September 21, 1983.
- Other Documents as shown in the Index of the Administrative Record.

Description of Selected Remedial Alternative

The selected remedial alternative is ground water interception and treatment plus capping, and includes the following major components:

- Deed and access restrictions to prevent future development of the sites.
- A multi-layer cap over both sites which meets the requirements of the Resource Conservation and Recovery Act.
- Re-routing surface waters to reduce potential for contaminant movement to surface water.
- Leachate collection and treatment for NSL.
- Ground water collection and treatment for both sites.
- Monitoring to ensure effectiveness of remedy components listed above.

Consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (P.L. 99-499)(SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, I have determined that, at the Enviro-Chem Corporation and Northside Sanitary Landfill Superfund sites, the selected remedial alternative is cost-effective, consistent with a permanent remedy, provides adequate protection of public health, welfare and the environment, and utilizes treatment to the maximum extent practicable.

The State of Indiana has been consulted and concurs with the selected remedial alternative.

The action will require operation and maintenance activities to ensure continued effectiveness of the remedial alternative as well as to ensure that the performance objectives meet applicable State and Federal surface and ground water quality criteria.

I have determined that the action being taken is consistent with Section 121 of SARA, 42 U.S.C. Section 9621.

In accordance with Section 121(c) of SARA, the remedial action taken at Enviro-Chem Corporation and Northside Sanitary Landfill shall be reviewed no less often than every 5 years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

Valdas V. Adamkus
Regional Administrator

9/25/87
Date

Attachments: (1) Summary of Remedial Alternative Selection
(2) Community Relations Responsiveness Summary

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION
ENVIRO-CHEM CORPORATION AND NORTHSIDE SANITARY LANDFILL SITES,
ZIONSVILLE, INDIANA

I. Location and Description - ECC and NSL

The Enviro-Chem Corporation (also referred to as Environmental Conservation and Chemical Corporation, or ECC) and Northside Sanitary Landfill (NSL) are both on the Superfund National Priorities List, and are adjacent to each other. During the course of U.S. EPA's investigations, it became obvious that it would be difficult and more costly to implement individual remedies at the two sites because of their close proximity. U.S. EPA is selecting a combined remedy to clean up the sites, as explained in this document.

The Enviro-Chem Corporation and Northside Sanitary Landfill (NSL) are located in a rural area of Boone County, about five miles north of Zionsville and ten miles northwest of Indianapolis (Figure 1). Farmland borders the southern and eastern edges of the combined site area. Residential properties are located to the north and west, within one-half mile of the facilities. A small residential community, Northfield, is located north of the sites on U.S. Route 421. Approximately fifty residences are located within a mile of the sites.

An unnamed ditch runs north to south between the two sites, along the western edge of the landfill, and joins Finley Creek at the southwestern corner of the landfill (Figure 1). Finley Creek runs along the eastern and southern edge of the Northside site and flows into Eagle Creek about one-half mile downstream from the sites. Eagle Creek flows south from its confluence with Finley Creek for ten miles before it empties into Eagle Creek Reservoir. The reservoir supplies approximately six percent of the drinking water for the City of Indianapolis.

II. Site History - ECC

ECC began operations in 1977 and was engaged in the recovery/reclamation/brokering of primary solvents, oils, and other wastes received from industrial clients. Waste products were received in drums and bulk tankers and prepared for subsequent reclamation or disposal.

Accumulation of contaminated stormwater onsite, poor management of the drum inventory, and several spills caused State and U.S. EPA investigations of ECC. In an attempt to handle wastes generated onsite, approval was sought by ECC to dispose of 5,000 gallons per day of oil recovery wastes and 1,000 to 1,500 gallons per week of still bottoms at NSL. Approval to dispose of the still bottoms was granted (with conditions) by the Indiana Stream Pollution Control Board (SPCB) on October 11, 1977; however, the request to dispose of the liquid waste from the oil recovery operations was denied.

Subsequently, the company sought other avenues of waste disposal. An agreement was reached between the Indiana State Board of Health (ISBH), ECC and NSL to allow disposal of oily wastes in the landfill with municipal refuse. Following expiration of this agreement May 1979, ECC added units to process wastewater by distillation onsite. The product water was used as boiler makeup water.

In September 1979, the SPCB met to discuss an intentional release of process and discharge water from ECC. The board ratified an Agreed Order that included a fine and provisions to upgrade the methods of recordkeeping at the facility.

By April 1980, the ISBH submitted documentation to the Indiana Environmental Management Board (EMB) concerning ECC violations of the Environmental Management Act, the Air Pollution Control Law, and the Stream Pollution Control Law. Based on these violations, the EMB referred the matter to the Office of the Attorney General in May 1980.

On November 19, 1980, a Resource Conservation and Recovery Act (RCRA) Part A application was filed with U.S. EPA to operate a container and tank storage facility. On February 10, 1982, U.S. EPA requested that ECC submit a RCRA Part B permit application. The application was due on August 18, 1982, but was not submitted.

A Consent Decree was issued in July 1981, by the Boone County Circuit Court, imposing a civil penalty against ECC. Furthermore, the court placed ECC into receivership and prohibited the company from using NSL for disposal of wastes. The decree gave ECC until November 1982, to comply with environmental laws and regulations.

In February 1982, the EMB placed a freeze on drum shipments to the facility to assure compliance with the Consent Decree regarding storage of drums, location of materials onsite and in transit, and the removal of sludge.

In May 1982, ECC was ordered by the court to close and environmentally secure the site for failure to reduce hazardous waste inventories. Two days later ECC's court receiver filed a closure plan with the Boone County Circuit Court. By August 1982, ECC was found to be insolvent.

Surface contaminants were removed from ECC in an operation extending from March 1983 through 1984. Actions included removal and treatment or disposal of cooling pond waters, approximately 30,000 drums of waste, 220,000 gallons of hazardous waste from tanks, 5,650 cubic yards of contaminated soil and cooling pond sludge.

In March 1985, contaminated water was discovered ponded on the concrete cap at the southern end of ECC. It was determined that this water was runoff, and not ground water rising up through the concrete pad. During the resulting emergency action, a sump was constructed at the southeast corner of the site, and 20,000 gallons of contaminated water containing high levels of volatile organics were removed and disposed of.

The ECC site was included on the proposed National Priorities List of December 1982, and was made final in September 1983. The site is currently ranked 230 out of a total of 951 sites.

III. Current Site Status - ECC

As a result of the emergency action in 1983, all drums onsite were removed, and all tanks were emptied and cleaned. The wastes and sludge in the cooling pond were removed and disposed of, and the pond was filled in. The only structures remaining on the site are the cleaned tanks, the process building, the A-frame structure and the concrete pad at the south end of the site (Figure 2). The emergency actions taken have eliminated the major surface sources of contamination at the ECC site. A current source of contaminant at the site is the soil which contains high concentrations of organic compounds. It is possible that other sources may be present within the area to to be remediated.

A. Hazardous Compounds Present at ECC

The contamination found in certain media, such as soil, is obviously attributable to ECC. However, determining the source of contamination in the surface water and sediments, and the ground water is not as straight-forward, because of the location of the sites relative to each other. The following presentations for surface water and sediments, and ground water discuss and identify ECC as the potential source of the contamination, where possible.

1. Soil

Soil samples were taken in two phases - phase I, which was done before the removal of 2 feet of contaminated surface soil from most of the site, and phase II which was done after the surface removal. The results of the phase II sampling show that contaminated soils are present over much of the ECC site. Volatile organic compounds are the most widespread organic contaminant at ECC and were detected to the maximum soil sampling depth of 8.5 feet. The volatile organic compounds ranged up to 14,600,000 ug/kg. Other types of contaminants found in the Phase II sampling effort at ECC include phthalates, acid extractable compounds, polynuclear aromatic hydrocarbons, and polychlorinated biphenyls (PCBs).

2. Surface Water and Sediments

The City of Indianapolis has detected organic compounds in Finley Creek at Highway 421 (Figure 1) since 1984. In addition, during the Remedial Investigation (RI) organic contamination, consisting mainly of chlorinated hydrocarbons, was found at one off-site sample location. This sample location is in Finley Creek downstream of both ECC and NSL. It is therefore difficult to pinpoint the exact source of the chlorinated hydrocarbons. However, a review of ECC site records and the chemical analysis of environmental media at ECC has shown that the types of compounds and their relative ratios are consistent with those compounds identified at the downstream sampling location.

ECC site records report that chlorinated hydrocarbon solvents were processed at the facility. Further, drainage patterns direct overland flow from the vicinity of the ECC and NSL sites toward the downstream sampling location. A second sampling location is approximately 750 feet upstream of the downstream location on Finley Creek but receives runoff only from the NSL site. Surface water from this sampling location was not found to be contaminated by chlorinated hydrocarbons.

Ponded water was discovered on ECC and was sampled after the surface cleanup was completed. Results of these analyses reveal that all three sample locations were contaminated with a variety of base/neutral and volatile organic compounds. Several of the volatiles were also detected at the downstream location.

3. Ground Water

The Remedial Investigation (RI) identified two hydrogeologic units beneath ECC. From the surface, these units are: a zone of glacial till with sand and gravel lenses (also referred to as glacial till water-bearing unit); and a deep confined aquifer consisting of sand and gravel. A large sand and gravel lens was encountered in the glacial till water-bearing unit beneath ECC. In the ECC RI, this unit was referred to as the shallow sand and gravel zone. This sand and gravel zone extends into the southwest corner of NSL.

Ground water below ECC generally travels south and discharges into Finley Creek or the unnamed ditch near the confluence with Finley Creek. Interpretation of hydrogeologic data indicate that Finley Creek is a ground water discharge area.

In the shallow saturated zone, which consists of glacial till above a large sand and gravel lens, the following list of contaminants were found at the indicated levels in two shallow wells (15 feet and 24 feet deep) near the southern end of ECC:

trans-1,2-dichloroethene	4,000 ug/l
trichloroethene	28,000 ug/l
benzene	less than 9 ug/l
1,1-dichloroethane	96 ug/l
chloroform	less than 9 ug/l
1,1-dichloroethene	10 ug/l
trans-1,3-dichloropropene	77 ug/l
vinyl chloride	86 ug/l

The underlying sand and gravel lens was also found to be contaminated with inorganic and organic compounds.

Contamination was not found in the deep confined aquifer.

B. Pathways of Exposure at ECC for the No Action Alternative

1. Soil

Following the 1983-1984 emergency action, a 1-foot glacial till cover was placed over the northern portion of ECC. This material was taken from a borrow area north of NSL, was tested and found to be clean before placement. Samples taken thereafter of ponded water on the cover material, as well as the surface water runoff from this area, reveal contamination of the cover material.

The cover material could have been contaminated in a number of ways. The physical placement of the cover and the use of heavy equipment to put it in place during wet weather may have caused the cover material to be mixed with the contaminated soil below. In addition, upward migration of contaminants into the cover material, as a result of capillarity, could have occurred.

A fence around ECC currently limits unauthorized access and direct contact with the contaminants onsite.

Transport of contaminants from onsite soils is also likely through leaching. As water infiltrates through the contaminated soil, it will desorb many compounds and eventually leach into the ground water in the shallow saturated zone. This is presently the case as the ground water samples from the shallow saturated zone were found to be contaminated with volatile organics.

2. Surface Water and Sediments

Both the unnamed ditch and Finley Creek receive ground water discharge and surface water runoff from ECC. Contaminants in the surface water may volatilize, degrade precipitate or adsorb to sediments, or remain in solution and be transported downstream to Eagle Creek and eventually the Eagle Creek Reservoir. Contaminants within the stream sediment may dissociate and reenter solution or may be scoured and resuspended in high flow and carried downstream.

3. Ground Water

Contaminants have migrated downwards to the shallow sand and gravel aquifer. This is evidenced by low-level contamination found in the shallow sand and gravel aquifer onsite. Vertical gradients between the shallow saturated zone and the sand and gravel aquifer currently are upward. However, future excavation at the site could exascerbate ponding of water onsite and reverse the gradient, enabling downward migration of contaminants to the shallow sand and gravel aquifer. In addition, pumping wells placed in the sand and gravel aquifer could reverse the vertical gradient. Some contamination may remain in the cooling pond and may also cause continued contamination of the shallow sand and gravel aquifer.

Evidence of downward migration of contaminants from the shallow sand and gravel and glacial till to the deep confined aquifer was not found and is highly unlikely now or in the future due to the upward vertical gradient.

C. Risk to Receptors at ECC for the No Action Alternative

1. Soil

Because the surface of the ECC site is contaminated, receptors (plants and wildlife, as well as humans) could inhale, ingest, and contact hazardous compounds in the soil directly.

In addition, the heavily contaminated soil below the cap could be a risk to receptor populations since any future excavation might bring higher concentrations of contaminants to the surface.

2. Surface Water and Sediments

Receptors may be exposed to contamination in surface water by wading in the creek, ingesting contaminated water, or ingesting fish which have bioaccumulated contaminants. During low flow periods, contaminated sediments may be exposed along the stream banks and may adhere to hands, clothing or pets and be transported into the home in this manner or as dust, and inadvertently ingested or inhaled.

3. Ground Water

During the RI, five residential wells within one-half mile of ECC were sampled and analyzed for inorganics and organics. No evidence was found that contamination from ECC has migrated to the residential wells. However, receptors could potentially contact or ingest the contaminated ground water if potable wells were to be constructed within the zones of contamination.

IV. Site History - NSL

From aerial photos, it appears that landfill operations began sometime between 1955 and 1962. From 1972 to 1973, numerous operational deficiencies were reported to ISBH inspectors including failure to cover refuse, surface burning, underground fires, leachate and vermin problems. In June 1972 and December 1973, ISBH ordered the owner to cease operations at the landfill. The operation continued into early 1974, which resulted in the State issuing a complaint in May 1974 again ordering operations to cease. In February 1975, a permit was issued to operate the landfill.

In March and September 1978, ISBH noted that unapproved wastes were disposed of at NSL including paint sludges, acids, spent acids and waste oil.

Between 1979 and 1982, portions of the unnamed ditch and Finley Creek were rechanneled by the owner of NSL. Some of these former drainageways were not filled in and are currently evident.

In April 1980, U.S. EPA inspectors reported that leachate from NSL was observed entering the unnamed ditch on the west side of the site. The owner of NSL was ordered to remedy the problem which he attempted to do by applying clay to the affected area.

In November 1980, the owner filed a RCRA Part A application to operate NSL as an existing hazardous waste disposal facility. In February 1981, the owner requested zoning approval from the Boone County Area Planning Commission to expand the landfill east of the existing landfill area. By 1981, NSL had accepted at least 16 million gallons of hazardous substances.

An Agreed Order was signed in July 1981 between the Environmental Management Board (EMB) and NSL whereby NSL was ordered not to accept waste from ECC. This order arose partly from reports that NSL accepted unapproved waste from ECC.

In October 1981, NSL was given conditional approval to receive sewage sludge for disposal, provided that the owner first install a leachate collection system. NSL was issued a Notice of Violation in June 1982, for accepting sludge prior to the completion of the required system.

In March 1982, the owner applied to ISBH for a permit to operate NSL as a hazardous waste landfill. The State refused this application in July 1982, after ground water contamination was observed in a monitoring well located near the southwest corner of the landfill, adjacent to the unnamed ditch. In addition, ISBH required the owner to begin the assessment stage of a RCRA ground water monitoring program.

In September 1983, NSL submitted a RCRA Part B permit application to U.S. EPA. An inspection of the landfill by State inspectors in December 1983, found that leachate seeps were continuing on the north and east sides of the landfill and that the leachate collection tanks were in need of pumping. In November 1985, U.S. EPA denied the RCRA Part B application for NSL.

In April 1983, NSL's Hazardous Waste Operating Permit was denied because of deficiencies in its closure, post-closure and ground water assessment plans. In October 1983, NSL's Solid Waste Operators Permit was denied because of leachate collection problems and acceptance of unapproved waste.

In May 1983, the EMB issued a Notice of Violations, Compliance Order and Hearing to NSL, alleging numerous violations of the Indiana Environmental Management Act and associated rules, and ordered NSL to undertake certain remedial measures. The State was joined in this action by several residents living within 1.5 miles of NSL in September 1983. The hearing began in January 1984, and the hearing officer released his Recommended Final Order in November 1986. In February 1987, the Indiana Solid Waste Management Board (assuming the responsibility of the EMB) adopted the hearing officer's recommended final order. Among the stipulations of this order are:

- NSL shall install and maintain a functioning leachate collection system at the base of the trash around the entire perimeter of the landfill;

- NSL shall install a slurry wall (hydraulic cut-off barrier), or undertake construction utilizing a different technology, with the objective being to prevent contaminated ground water from migrating off-site;

- NSL shall conduct ground water monitoring pursuant to RCRA monitoring protocol;

- NSL shall accept no further solid waste except that amount needed to adequately contour the site.

The NSL site was included on the proposed National Priorities List of September 1983, and was made final in September 1984. The site is currently ranked 237 out of a total of 951 sites.

V. Current Site Status - NSL

As of April 1987, NSL was continuing to operate as a solid waste landfill. The RI revealed contamination in the subsurface soil, surface water and sediment, leachate, and ground water.

A. Hazardous Substances Present at NSL

The contamination found in certain media, such as soil and leachate, is obviously attributable to NSL. However, determining the source of contamination in the surface water and sediments, and ground water is not as straightforward, because of the location of the sites relative to each other. The following presentations for surface water and sediments, and ground water discuss and identify NSL as the potential source of contamination, where possible.

1. Soil

Surface soil samples were taken from the landfill proper and showed no contamination. It is believed that these samples were taken from uncontaminated cover material that was part of the sanitary landfill operation. However, all of the subsurface soil samples, taken from all sides of the landfill, showed contamination. The highest contaminant concentrations were found near the southwest corner of the landfill (Figure 3). The contaminants found in subsurface soil samples include volatile organics, oil and grease, inorganics, and pesticides.

2. Surface Water and Sediments

Surface water sampling was conducted in two phases. The highest concentration of contaminants in the surface water was found in the unnamed ditch between ECC and NSL, and in Finley Creek downstream of ECC and NSL (Figure 3). Contaminants found include inorganics, volatile organics, and base neutrals and acids.

Analysis of sediment samples revealed a wide variety of organic contaminants. The greatest number and the highest concentration of contaminants were detected in Finley Creek below the confluence with unnamed ditch (Figure 3). Inorganic contamination was also found in Finley Creek upstream of the confluence with unnamed ditch. In the sediments of Finley Creek below the confluence with unnamed ditch, and also in a former segment of Finley Creek near the southeast corner of NSL, PCBs were detected. Pesticides were also detected in Finley Creek sediments near the southeast corner of NSL.

3. Leachate

Leachate was sampled and analyzed from a variety of sources on all sides of the landfill. These samples included leachate liquid from the landfill, other liquids observed in ditches immediately adjacent to the landfill, soil at leachate sampling points and in ditches, and the leachate collection tanks. The leachate soils had more compounds and concentrations of contaminants than the liquid. The RI found that the leachate soil samples collected on all sides of the landfill showed contamination. Contaminants found in these soils include organic and inorganic compounds.

Sampling and analysis of the existing leachate collection tanks revealed a variety of volatile organics, base neutrals and acids, and inorganics.

4. Ground Water

The hydrogeologic units beneath NSL are essentially the same as below ECC. From the surface these units are: a zone of glacial till with sand and gravel lenses (also referred to as glacial till water-bearing unit); and a deep confined aquifer consisting of sand and gravel. A large sand and gravel lens was encountered in the glacial till water-bearing unit beneath ECC. In the ECC RI, this unit was referred to as the shallow sand and gravel zone. This sand and gravel zone extends into the southwest corner of NSL.

In the glacial till, contamination was found in the ground water on all sides of the landfill. Analysis of the ground water in the glacial till zone revealed a wide variety of inorganics, semi-volatiles and volatile organics, such as trichloroethene.

Water samples obtained from the sand and gravel lens in the southwest corner of NSL contain semi-volatiles, pesticides, inorganics, and volatile organics including two at concentrations higher than U.S. EPA maximum contaminant limits. These chemicals are benzene and 1,1-dichloroethene.

Ground water from both ECC and NSL converges at the unnamed ditch and/or Finley Creek. Because these surface waters are discharge areas for contaminated ground water from both sites, it is difficult to separate the ground water/surface water contamination in those areas by site.

B. Pathways of Exposure at NSL for the No Action Alternative

1. Soil

Three soil samples taken from the landfill surface did not indicate that the contaminants are present in the surface soil. Samples were not taken below the landfill surface, but soil samples taken in the subsurface around the landfill indicated several areas of contamination. Potential future erosion of the landfill surface could result in exposure and migration of contaminants disposed of in NSL.

2. Surface Water and Sediments

Both the unnamed ditch and Finley Creek receive ground water and surface water runoff from NSL. Contaminants in the surface water may volatilize, degrade, precipitate or adsorb to sediments, or remain in solution and be transported downstream to Eagle Creek and eventually to Eagle Creek Reservoir.

Contaminants within the stream sediment may dissociate and reenter solution or may be scoured and resuspended in high flow and carried downstream.

3. Leachate

Leaching represents a significant transport of contaminants. As water infiltrates through the contaminated soil and debris, it will desorb many compounds and eventually leach into the ground water within the glacial till water-bearing unit. This is presently the case as the ground water samples from the glacial till water-bearing unit were found to be contaminated with inorganics and organics. Leachate also seeps from the side slopes of the landfill and discharges to the unnamed ditch and Finley Creek.

4. Ground Water

Contaminants in the glacial till water-bearing unit migrating downwards contaminate the sand and gravel lenses. Low-level contamination found in the sand and gravel lenses indicate that this has occurred.

Evidence of downward migration of contaminants from the glacial till water-bearing unit to the deep confined aquifer was not found in the ECC RI and is highly unlikely now or in the future due to the upward vertical gradient reported therein.

The hydrogeological investigation conducted during the RI indicated that contamination from the glacial till water-bearing unit and the shallow sand and gravel lenses within that unit migrate to the unnamed ditch and/or Finley Creek.

C. Risk to Receptors at NSL for the No Action Alternative

1. Soil

Heavily contaminated subsurface soil could be a risk to receptor populations since erosion or future excavation might bring contaminants to the surface. Once chemicals are at the surface, receptors (plants, wildlife, and aquatic organisms as well as humans) may inhale, ingest, and contact harmful compounds directly.

2. Surface Water and Sediments

Receptors may be exposed to contamination in surface water by wading in the creek, ingesting contaminated water, or ingestion of fish which have bioaccumulated contaminants.

During the low flow periods, contaminated sediments may be exposed along the stream banks and may adhere to hands, clothing or pets and be transported into the home in this manner or as dust, and inadvertently ingested or inhaled.

3. Leachate

The greatest risk presented by leachate is after it enters another medium.

Once in the ground water, leachate will have the same risk to receptors as the ground water itself; that is, receptors could potentially contact or ingest the contaminated ground water if potable wells were to be constructed within the zones of contamination.

In the surface water, leachate will pose a risk to receptors who may be exposed by wading in the creek, ingesting contaminated water, or ingesting fish which have bioaccumulated contaminants. Further, the leachate may be toxic to fish themselves.

4. Ground Water

During the RI, five residential wells within one-half mile of NSL were sampled and analyzed for inorganics and organics. No evidence was found that contamination from NSL has migrated to the residential wells. However, receptors could potentially contact or ingest the contaminated ground water if potable wells were to be constructed within or immediately adjacent to the zones of contamination.

VI. Combined Action Alternatives Evaluation

Because the ECC and NSL sites are next to each other, it became obvious during the Remedial Investigation for each site that it would be difficult and more costly to implement remedies for the two sites individually. For this reason, it was decided that a separate report, based on the Feasibility Studies, be prepared to discuss a combined remedy for the two sites. This final report was called the "Combined Alternatives Analysis Report, Northside Sanitary Landfill and Environmental Conservation and Chemical Corporation" (CAA). The alternatives developed in the CAA are derived from the alternatives developed for the individual sites and discussed in the ECC and NSL Feasibility Studies. The purpose of combined alternatives for the adjacent sites is to ensure that the remedial actions are compatible with each other, to avoid duplicate remedial actions, and to integrate remedial actions to achieve cost savings.

A. Remedial Action Goals

Remedial action goals were developed and presented in the ECC and NSL FS reports to address each of the site hazards identified for the sites. They were identified for each of the following operable units: soil and landfill contents, landfill leachate, ground water, and surface water and sediment.

1. Remedial Goals for Soil and Landfill Contents

Minimize Direct Contact--Minimize risk to public health and environment from direct contact, inhalation or ingestion of NSL landfill contents, contaminated surface or subsurface soil on ECC and NSL, leachate soils and sediment in the old creek beds of Finley Creek.

2. Remedial Goals for Leachate

Minimize Direct Contact--Minimize risk to public health and environment from direct contact with NSL leachate liquid in the collection system and leachate seeping from the sides of the landfill.

Control Migration to Ground Water--Minimize and mitigate leaching of contaminants from the ECC-contaminated soil or NSL contents into the ground water to adequately protect potential receptors of the ground water at or near the site.

Control Migration to Surface Water--Minimize and mitigate the overland migration of contaminants from leachate seeps to the unnamed ditch and Finley Creek to adequately protect public health and the environment from surface water and sediment contamination, ingestion of contaminated aquatic life, and direct contact with leachate liquid.

3. Remedial Goals for Ground Water

Minimize Direct Contaminant Consumption--Minimize current and possible future risk to public health from direct consumption of contaminated ground water by nearby users.

Control Migration to Surface Water--Manage migration of contaminated ground water to the unnamed ditch and Finley Creek so public health and the environment are adequately protected from surface water and sediment contamination and ingestion of contaminated aquatic life.

4. Remedial Goals for Surface Water and Sediment

Control Migration to Surface Water--Minimize and mitigate the threat to the environment and public health from direct contact, inhalation, and ingestion of contaminants in surface water and sediment resulting from future release of hazardous substances from landfill leachate and ground water discharge.

B. Combined Alternatives Considered

The nine combined remedies developed and presented in the CAA are derived from the alternatives developed for the NSL and ECC sites and presented in detail in the respective FSs. Since each of the NSL or ECC alternatives contains many individual components, the possible combinations far exceed the nine CAA alternatives developed. The CAA alternatives are intended to represent a wide range, both in terms of cost and public health and environmental benefits, of alternatives that meet the remedial action goals.

Alternative 1--No Action

The No Action Alternative is required by the National Contingency Plan and the National Environmental Policy Act to be carried forward. It provides a baseline for comparison of other alternatives.

Alternative 2--Access Restrictions with Soil Cover and Leachate Collection and Treatment

Alternative 2 includes deed restrictions, fencing, a soil cover over the landfill to promote revegetation, a soil cover over the ECC site, disposal of sediment on NSL, rerouting the surface waters, collection and treatment of the leachate seeps, and monitoring of the leachate, ground water, and surface water. This alternative addresses all of the operable unit goals with two exceptions. It would not mitigate or minimize the leaching of contaminants from ECC or NSL to the ground water nor would it manage the migration of contaminated ground water to the surface waters.

The intent was to present a low-cost alternative that offers the lowest level of protection to public health and the environment. If contaminant concentrations in the proposed monitoring wells exceed applicable and relevant and appropriate requirements (ARARs) limits, future remedial actions would be initiated. Alternative 2 is estimated to cost $18.1 million.

Alternative 3--Access Restrictions With RCRA Cap and Leachate Collection and Treatment

Alternative 3 is identical to Alternative 2 with the exception of a RCRA cap over both sites in place of a soil cover. This alternative is intended to provide a greater level of protection by reducing contaminant migration to the ground water through reduction in surface water infiltration while also meeting technical requirements of landfill capping for site closure under RCRA. Monitoring would still be necessary to detect migration of contaminants in the ground water. The quantity of leachate migrating to the ground water will be reduced; however, the continuing contamination of the surface water from ground water discharge remains. As with Alternative 2, if contaminant concentrations in the proposed monitoring wells exceed ARARs, future remedial actions would be initiated. Alternative 3 is estimated to cost $29.9 million.

Alternative 4--Access Restrictions With Soil Cover, Leachate Collection, Ground Water Interception, and Treatment

Alternative 4 is essentially identical to Alternative 2 with the addition of ground water interception and treatment to mitigate the migration of ground water contaminants offsite or to the surface waters. This alternative addresses the ground water and surface water remedial action goals of providing adequate protection of public health and the environment from further contamination of the surface water. Leachate from NSL would continue to migrate to the ground water so collection and treatment would be required indefinitely at NSL. At ECC, soil contaminants which leach to ground water would be removed and treated, though treatment would also likely be required indefinitely (possibly for 100 years or more). Alternative 4 is estimated to cost $20.8 million.

Alternative 5--Access Restrictions with RCRA Cap, Leachate Collection, Ground Water Interception, and Treatment

Alternative 5 includes leachate and ground water interception and treatment with a RCRA cap over the sites. The objective of the cap is to minimize further leaching of soil or landfill contaminants to the ground water. This may eventually allow termination of the ground water collection and treatment system, though leachate collection and treatment would continue to be necessary. The operational period of the collection and treatment system cannot be reliably estimated but could be less than the time required for Alternative 4. Alternative 5 is estimated to cost $33.9 million.

Alternative 6--Access Restrictions With RCRA Cap, Leachate Collection, Ground Water Isolation and Treatment

Alternative 6 employs a ground water collection system intended to lower the water table beneath the contaminated or potentially contaminated zones at both sites. Combined with a RCRA cap the alternative should eventually prevent further contamination of the ground water and result in treatment of leachate only. However, the collection system would be operated indefinitely to maintain the lower water table. This alternative is intended to provide a greater level of protection to the public health and environment by reducing contaminant migration. Alternative 6 is estimated to cost $37.3 million.

Alternative 7--Access Restrictions With RCRA Cap, Leachate Collection, Ground Water Isolation and Treatment, and ECC Soil Vapor Extraction

Alternative 7 incorporates all the components and objectives of

Alternative 6 with the additional treatment of ECC-contaminated soil. Because the alternative includes a RCRA cap over ECC combined with a lowering of the water table, the soil vapor extraction treatment would not likely result in a reduced ground water treatment period relative to Alternative 6. This is because in either alternative leaching of soil contaminants to the ground water is minimized by the cap and the lowering of the water table. The public health risk from direct contact with ECC-contaminated soil in the event of site development would be greatly reduced. Alternative 7 is estimated to cost $39.3 million.

Alternative 8--Access Restrictions With RCRA Cap, Leachate Collection, Ground Water Isolation and Treatment, and ECC Soil Incineration

Alternative 8 incorporates the objectives of Alternative 7. ECC-contaminated soil, however, is treated by onsite incineration. This results in permanent destruction of the organic contaminants. Alternative 8 is estimated to cost $76.1 million.

Alternative 9--Access Restrictions With Onsite RCRA Landfill

Alternative 9 includes deed restrictions, excavation of the landfill contents, peripheral soils, sediments and ECC-contaminated soil and disposal of the waste materials in an onsite RCRA-type facility. This alternative addresses all the operable unit goals and provides the highest level of protection of all the alternatives. However, the risks of exposure during construction and implementation would be greater than any of the other alternatives. Alternative 9 is estimated to cost $109.4 million.

Alternative Combinations Not Included

Several potential combinations of NSL and ECC alternatives were not included since they either did not satisfy the remedial action goals, or other combinations better satisfied the objectives intended. They are discussed below.

- ECC Soil Excavation and Disposal Offsite

  This action was not included in any CAA Alternative since it is costly (30-year present worth of $3,700,000) and does not result in destruction of contaminants.

- Incineration of NSL Landfill Contents and Contaminated Soil

  Incineration of NSL landfill materials and contaminated soils was eliminated as a viable technology in the NSL FS Screening (see NSL FS Chapter 3). Several disadvantages of incinerating the entire NSL landfill are: the risk of exposure to contaminants during excavation, unknown contents of the landfill, lengthy time to implement and incinerate the solids, and the high cost (capital cost is estimated to be $3 billion to $5 billion). Incineration of isolated and heavily contaminated areas within the landfill could be accomplished at a much lower cost if such areas could be effectively located. Risks of exposure or offsite migration of contaminants during excavation would still be important disadvantages.

VII. Recommended Alternative

U.S. EPA's recommended alternative is Alternative 5 (Figure 4). The major components of the alternative are: access restrictions; RCRA-compliant cap and surface controls; monitoring; leachate collection, ground water interception; and treatment.

- Access Restrictions

  Deed restrictions will be placed on the landfill property and the ECC site. The restrictions should prevent future development of the land to protect against direct contact with contaminants or further migration that could result from site excavation and development. The deed restrictions should also prohibit use of ground water or installation of wells onsite. Access to the site will be controlled by completing the fencing around the site perimeter and posting signs.

- RCRA-Compliant Cap and Surface Controls

  These actions include removal of contaminated sediment, rerouting of creeks, and construction of a multi-layer cap over ECC and NSL. The cap will be designed to comply with RCRA performance-based standards. In addition, the needs for an appropriate gas venting system will be determined during design.

  Contaminated leachate soils and sediment in the ditch north of NSL and the old creek beds of Finley Creek would be excavated, dewatered, and disposed of onsite beneath the cap. It was assumed for cost estimating that excavation to a 1-foot depth would be necessary and a total of 4,200 cubic yards would be removed.

  The actual volume removed will be dependent on further sampling undertaken as part of final design. The creek beds will be backfilled and a soil cover would be placed over areas not under the cap. Contaminated water resulting from the dewatering of the sediment will be treated in the onsite treatment system.

  The unnamed ditch will be rerouted to the west of ECC and portions of Finley Creek will be rechannelized as shown in Figure 4. This will route surface waters farther away from contaminated areas, and increase the space available to construct the French drain system.

  Prior to placing the cap, the site will be graded to eliminate sharp grade changes and to provide for drainage. Also the former process building on the ECC site will be demolished. The concrete floor and foundation will remain and the cap placed on top. The cap will be seeded to control erosion and promote evapotranspiration.

- Monitoring

Contaminant migration and remedial action performance will be assessed through a regular leachate, ground water, and surface water monitoring program. Leachate will be sampled at the leachate collection sump as part of the leachate collection and treatment system. Ground water will be monitored during the first year using 15 of the existing wells and an additional 26 new monitoring wells (Figure 4). The 41 monitoring wells will be sampled quarterly the first year and analyzed for the full organic and inorganic priority pollutant list.

Sampling needs may change over time as different types and concentrations of contaminants migrate to the monitoring points. It is estimated that subsequent semiannual sampling will be necessary at 14 wells. Water levels of monitoring wells will be taken at the time of sampling and gradients will be calculated.

Surface water and sediment will be sampled at eight locations semiannually. These samples will be analyzed for volatile organic compounds, base/neutrals, pesticides, PCBs, and inorganics. Depending on surface water results, fish may be occasionally collected from Finley and Eagle Creeks and their tissues analyzed for bioaccumulation of organic contaminants.

- Leachate Collection

The leachate collection system will consist of a French drain encircling the landfill. The drain will be about 4 feet deep and about 6,000 feet in length. Perforated pipe laid in the trench will be used to transport leachate to a sump located near the treatment system in the southwest corner of the site.

The trench will be backfilled with gravel. A 1-foot layer of gravel will also be placed on the sideslopes of the landfill to provide a drainage path for leachate seepage. The multilayer cap will extend over the gravel layer and the drainage trench. The existing leachate collection system will be evaluated to determine its effectiveness. It will be decommissioned and replaced, if necessary.

- Ground Water Interception

The objective of the ground water collection system is to prevent contaminated ground water from migrating offsite and discharging to surface waters. The collection system described for the recommended alternative will meet this objective based on the information available to date. Further site investigations during final design may alter the design and alignment of the collection system; however, the objective of the ground water interception system will be met.

The ground water collection system will consist of a French drain installed along the southern and southwestern boundaries of the landfill and ECC. The trench will be about an average depth of 25 feet and will include two collection pipes, one set 5 feet below the existing water table and the other set at the bottom of the trench. It is anticipated that an approximate 5-foot overall drawdown of the water table at the collection system will be sufficient to prevent ground water movement past the system. The French drain will include an impermeable barrier on the south wall of the trench to minimize inflow of water from Finley Creek. The barrier consists of an impermeable synthetic membrane and at least 6 inches of compacted clay. It will extend 3 feet into the till below the sand and gravel deposit in the southwest area of the site. The barrier will also extend 75 feet beyond the western end of the drain.

The initial combined flowrate from the leachate and ground water collection systems is estimated to be 100 gpm with 40 gpm from the leachate collection system. Within 5 years, the flow is estimated to decrease to about 65 gpm because of a reduction in leachate generation from infiltration due to the impermeable cap.

- Treatment

Treatment of leachate and ground water will be required to meet effluent discharge limits and conditions to be set in an NPDES permit for discharges to Finley Creek. The limits likely applicable are presented in Table 1. The limits must protect aquatic life and human health from consumption of aquatic organisms and human health from use of the downstream Eagle Creek Reservoir as a drinking water supply.

The onsite treatment system will be capable of meeting the effluent limits. A powdered activated carbon treatment (PACT) system has been assumed as the system for leachate and ground water treatment because it is a system suited to the kinds of characteristics expected in the leachate and ground water. However, the PACT system is not the only system that could be used for treating the combined ground water/leachate flow. Other treatment systems can be used, such as activated sludge or biological contactors followed by activated carbon adsorption. Implementation of other treatment systems may result in different costs. The actual treatment system configuration will be developed through pilot or bench testing during design of the final remedial alternative. During final design, the treatment system will likely be modified based on pilot and bench-scale testing and more detailed evaluations of capital and operation and maintenance costs. The objective of meeting the discharge limits will be attained, however.

Leachate and ground water will be pumped to an onsite treatment plant consisting of precipitation, biological oxidation, and carbon adsorption. The two streams may be combined depending on the results of bench scale and pilot studies, in a 100,000-gallon holding tank. In the treatment system, the waste stream first passes through the precipitation process for removal of metals and other inorganics. Chromium, copper, iron, lead, and zinc were detected in the ground water and leachate samples and can be removed by precipitation. Hydroxide precipitation is used for cost estimating purposes. Flocculation and clarification follow the chemical addition and can be accomplished in one basin. Either flocculation with lamella gravity settlers or solids contact clarifiers could be used. Sludge is removed from the bottom of the basin and can be thickened, dewatered with a filter press, and disposed of in a RCRA landfill, if required.

Effluent from the precipitation process then goes through the PACT system, which is a patented activated carbon enhanced biological treatment system. The PACT system combines biological treatment and carbon adsorption into one process. The system works through the addition of powdered activated carbon to the influent of the activated sludge process. The system consists of carbon feeding equipment, an aeration basin with the necessary appurtenances, a clarifier, and solids handling equipment. Solids would be wasted to an aerobic digester followed by dewatering. Solids would then be disposed of at a RCRA landfill unless they could be delisted as a nonhazardous waste. Spent carbon in the waste solids could be separated and regenerated offsite.

Granular media filtration would be included in the treatment system following either the precipitation system or the PACT system or both. The advantage of having a filter after each unit would be that less metals would carry over into the PACT system and that solids with low settleability would be removed from the biological system effluent. For costing purposes, however, it is assumed that one filter will be used after the PACT system.

- Other Considerations

During recent investigations, an additional area of contamination was discovered to the south and southwest of ECC. The suite of compounds found in this area are similar to those found at the ECC site. This area (shown in Figure 4) will be more fully defined during the pre-design, and will be remediated along with ECC and NSL. The ground water collection system may need to be realigned to capture this contamination.

VII. Compliance with Superfund Amendments and Reauthorization Act (SARA) Cleanup Standards

A. Compliance with SARA §121

1) General Guidelines

Section 121 of SARA dictates cleanup goals and standards for remedial action. These begin with general guidelines for the selection of a remedy. Remedial actions which include treatment which permanently and significantly reduce the volume, toxicity or mobility of hazardous substances, pollutants and contaminants are preferable to those which do not. Offsite transport and disposal of contaminated material without treatment should be the least favored alternative where practicable treatment technologies are available.

Treatment of contaminated soil and refuse in order to permanently and significantly reduce the volume, toxicity or mobility of contaminants at ECC/NSL is not practicable. Treatment of NSL refuse would be nearly impossible because of the variety of materials, large volume, and resulting high cost. Treatment of ECC soils alone would not significantly reduce the amount of contamination at the combined site. Offsite transport of contaminated material is not a part of the remedy.

The remedial action must be protective of human health and the enviroment. Sections III and V of this document summarize the present exposure pathways and risks to human health and the environment. This remedial action will block those exposure pathways and protect human health, welfare, and environment from toxic materials at the sites.

The remedy must be cost effective. Section 300.68(i) of the NCP states the appropriate extent of remedy is defined as a "cost effective remedial alternative that effectively mitigates and minimizes threats to and provides adequate protection of public health and welfare and the environment." The FSs for ECC and NSL and the CAA carried out this analysis and determined that the selected remedy is cost effective.

The remedy must be effective in the long term. With proper operation and maintenance, this remedial action should effectively prevent further releases of contaminants and protect human health and the environment over the long term.

The comparison of alternatives must take into account the following factors:

- long-term uncertainties of land disposal;
- goals and objectives of the Solid Waste Disposal Act (RCRA);
- persistance, toxicity, mobility and propensity to bioaccumulate hazardous substances;
- short-and long-term potential for adverse human health effects;
- long-term maintenance costs;

- the potential for future remedial action costs if the chosen remedy were to fail;

- potential threat to human health and the environment associated with excavation, transportation, redisposal or containment.

The Endangerment Assessments, Feasibility Studies and Combined Alternatives Analysis considered all of these factors during screening of alternatives and recommendation of a final remedy.

2) Review of Remedial Action

SARA §121(c) requires that U.S. EPA review remedial actions that result in any hazardous substances, pollutants, or contaminants remaining at the site no less often than every five years after initiating the remedial action. This review should assess whether the remedial action is truly protective of human health and the environment and determine whether any further action is necessary. Because contaminants will remain on these sites, the remedy must be reviewed every five years.

B. Consistency with National Contingency Plan

SARA requires that remedial actions meet legally applicable or relevant and appropriate requirements of other environment laws. These laws include: the Toxic Substances Control Act, the Solid Waste Disposal Act (RCRA), the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA) and any State law which contains stricter requirements than the corresponding Federal law.

A "legally applicable" requirement is one which would legally apply to the response action if that action were not taken pursuant to §104 or §106 of CERCLA. A "relevant and appropriate" requirement is one that while not "applicable" is designed to apply to problems sufficiently similar that their application is appropriate. Legally applicable and relevant and appropriate requirements are referred to as ARARs.

Following is a description of State and Federal environmental laws which potentially are legally applicable or relevant and appropriate to different components of the remedy, and an explanation of how this remedial action meets those requirements.

1) Soil/Closure Requirements

Final RCRA closure and post-closure requirements are ARARs for NSL and ECC. The State administers closure and post-closure programs which are substantially equivalent to the Federal RCRA requirements.

Indiana's closure and post-closure regulations include performance-based standards which state that the sites be closed in a manner which:

- minimizes the need for further maintenance, and
- controls, minimizes, or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall or hazardous waste decomposition products to the ground or surface waters or the atmosphere.

These regulations also require that the cap minimize liquid migration, minimize maintenance, promote drainage, accommodate subsidence and have a permeability less than or equal to any bottom liner or natural subsoils. Indiana's closure and post-closure requirements change periodically to reflect the latest Federal RCRA requirements. The more stringent regulations in effect at the time of remediation will be the ARAR.

2) Ground Water and Leachate Collection

The State of Indiana has regulations which establish minimum water quality criteria for all the waters of the State including ground water. In addition, the State has a nondegradation policy which maintains that existing and potential uses of water must be protected. Finally, both RCRA and the Indiana Environmental Management Act require that measures be taken to prevent the release of contaminants into the ground or surface water which would threaten human health and the environment.

Ground water beneath the sites discharges into the unnamed ditch and Finley Creek, which flow into Eagle Creek Reservoir. After remedial construction, the sites will be capped nearly to the edge of the rerouted creek. Contaminated ground water entering Finley Creek potentially affects aquatic life in the creek, people eating fish caught in the creek, and people drinking water from Eagle Creek Reservoir. The French drain system will intercept contaminated ground water before it discharges to Finley Creek. This system will continue to be effective if contaminant concentrations increase. Access restrictions and deed restrictions will prevent installation of water supply wells on the sites upgradient of the creek. It is unlikely that Finley Creek itself will be used as a steady source of drinking water, given its variable flow and the availability of other supplies.

Table 1, which is an updated version of Table 2-4 in the CAA, lists calculated organic and inorganic leachate and ground water contaminant concentrations developed from data collected during the RI. It also lists numeric standards and criteria which are potentially relevant and appropriate to these contaminants under the circumstances:

- 1/10 96 hour LC 50 for aquatic life
- Ambient Water Quality Criteria developed under the Clean Water Act
  - protection of freshwater aquatic life
  - human consumption of contaminated aquatic organisms
  - human consumption of contaminated drinking water
- Maximum Contaminant Levels (MCLs) for public drinking water supplies, developed under the Safe Drinking Water Act
- Maximum Contaminant Level Goals (MCLGs) developed under the Safe Drinking Water Act

The stream criteria shown in Table 1 have been determined to be the major ARARs for ECC/NSL to protect aquatic life in Finley Creek, as specified in the current State of Indiana present use designation - partial body contact, warm water fishery. These four standards include 1/10 of the 96-hour LC 50, from State of Indiana Water Quality Standards, 330 IAC 1-1; and Protection of Aquatic Life, Acute and Chronic, and Consumption of Aquatic Organisms, from the CWA.

Contaminant concentrations at or below 1/10 of the 96 hour LC 50 and ambient water quality criteria for aquatic life will be used to protect aquatic organisms living in Finley Creek. The fourth set of criteria, for water which supports fish that may be eaten, is also an ARAR. Where the four criteria differ for the same chemical, the lowest level has been chosen for the target level to ensure maximum protectiveness. Contaminant concentrations in at least one ground water monitoring well have exceeded these levels. Since, at low flow conditions, the levels in Finley Creek would nearly equal the concentrations in the ground water, the ground water needs to be collected and treated.

These criteria, as ARARs, are consistent with RCRA. The application of the stream standards mentioned above is substantially equivalent to RCRA ACLs. RCRA requirements for corrective action are also considered an ARAR. Under 40 CFR 264.100, a corrective action program (ground water collection system) meets RCRA requirements for corrective action.

The last three sets of numeric criteria on Table 1 (Drinking Water Standards) are ARARs for Finley Creek as a tributary to Eagle Creek Reservoir. Consequently, Finley Creek water should not contain concentrations of contaminants that would result in levels hazardous to human health at the water intake in the reservoir.

In Table 1, the standards and criteria selected by this process are underlined for each contaminant. As remedial action progresses, these benchmark levels must be reviewed because the underlying standards and criteria change over time as scientific knowledge increases.

One last set of standards may be an ARAR for ground water flowing beneath the sites. RCRA ground water protection standards (40 CFR 264.92) and concentration limits (40 CFR 264.94) apply to the ground water at regulated facilities that treated, stored, or disposed of hazardous waste in surface impoundments, waste piles, land treatment units, or landfills, after November 19, 1980.

3) Treatment and Discharge of Collected Ground Water and Leachate

The Clean Water Act limits discharges to navigable waterways. Individual discharges are regulated through National Pollutant Discharge Elimination System (NPDES) permits. The State administers water quality program which is substantially equivalent to the Federal NPDES requirements. The discharge limits established in the NPDES permit are designed to preserve the present use designation of the receiving waters and potential downstream uses. Finley Creek is currently designated as a partial body contact, warm water fishery. The NPDES regulations are an ARAR for effluent from Superfund site treatment plants which discharge offsite. The State permit requirements for constructing a treatment plant are an ARAR. The flow used to determine the discharge limits is the Q7, 10 flow of Finley Creek, which given the limited drainage area is assumed to be 0.0 to 0.1 cfs. Therefore, no mixing zone applies to Finley Creek when calculating discharge limits. Water quality-based NPDES permit limits will be based in part on the stream criteria contained in Table 1 and may include more stringent limits or whole effluent toxicity limits to protect against interactive effects of toxicants. New State regulations have been preliminarily adopted regarding water quality standards and mixing zones. The regulations having the effect of law at the time of the permit application will be utilized.

4) State N-95 Action

In addition to the RCRA closure and post-closure requirements that are an ARAR for the site, Indiana has taken enforcement action against NSL (Cause No. N-95) to close the facility and undertake certain actions which would prevent the release of contaminants from the site. The specific measures that are required include:

- installation and continued operation of a perimeter leachate collection system
- construction of a slurry wall or different technology to prevent off-site migration of contaminated ground water
- long term monitoring

- installation of a perimeter security fence
- construction of run-on and run-off controls

Although the order calling for these actions is presently being litigated, Indiana believes that these should be considered as an ARAR for remediating NSL. The proposed remedy meets or exceeds these requirements.

5) Rerouting Surface Water

The selected remedy will be implemented so as to minimize potential harm and avoid adverse affects to the site in accordance with Executive Order 11988, "Floodplain Management," and Executive Order 11990, "Protection of Wetlands." The natural and beneficial values of floodplains will be enhanced during the implementation of the selected remedy.

Finley Creek will be rerouted along the southern boundary of NSL in order to move the surface water further from the source of the contamination. The rechannelization of Finley Creek will meet permit requirements of the Indiana Department of Natural Resources as stipulated in the Flood Control Act (13-2-22). The rechannelization will be conducted in a manner which will not cause undue restrictions on the capacity of the floodway. The streambed and banks will be rehabilitated.

6) Ground Water Protection

The glacial till water-bearing unit beneath and surrounding ECC/NSL constitutes a Class II aquifer. The ground water from underneath the sites generally flows to the south or southwest and discharges into Finley Creek. The selected remedy will not restore the glacial till unit underneath the sites. However, it will prevent ground water withdrawal onsite as well as preventing contaminants from migrating either into Finley Creek or, however less likely, into the downgradient portion of the glacial till unit. This portion of the glacial till needs to be protected because it is outside the zone of deed and access restrictions and is currently used for drinking water. The zoning in this area would allow the ground water to be further utilized for either industrial or potable drinking purposes. The potential users of this supply would also become potential receptors to contaminants.

The prevention of contaminant migration which is achieved by the proposed remedy is therefore in accordance with U.S. EPA's Ground water Protection Strategy of August 1984. It would also insure that the State's drinking water and industrial water standards would not be jeopardized thus adhering to Indiana's nondegradation policy.

7) Onsite Construction Activities

The onsite construction activities at the site will create a significant amount of fugitive dust. In accordance with State of Indiana Rule 325 IAC 6-4-6, every available precaution will be taken during construction to minimize fugitive dust emissions.

IX. Consistency with National Contingency Plan

The National Contingency Plan, 40 CFR Part 300.68(i)(1), states that the appropriate extent of remedy shall be a cost-effective remedial alternative that effectively mitigates and minimizes threats to and provides adequate protection of public health and welfare and the environment. The selected remedy will attain or exceed applicable or relevant and appropriate Federal public health and environment requirements that have been identified for ECC and NSL. Based upon the analysis of the options, State and Federal environmental requirements, and the comments received from the public and the State, the recommended option has been determined to be consistent with Section 300.68.

X. Operation and Maintenance

Maintenance will be required for the cap because of erosion, freeze/thaw, and landfill settlement. Regular mowing of grass on the cap is required. Routine inspections of the cap surface and the leachate and ground water collection systems will be required semiannually. Replacement of collection system pumps, cleaning of collection system drains, and refurbishment of monitoring well screens will be undertaken as necessary.

The treatment system will require full-time operators to perform testing and maintenance, to adjust chemical and carbon feed rates, and to ensure that all process units are functioning properly. To provide for regular maintenance or in the event of treatment system failure, a 100,000-gallon holding tank is included. This tank provides a 2-day holding time for untreated leachate and ground water.

XI. Community Relations/Responsiveness Summary

In August 1984, a public meeting was held in Zionsville to familiarize the public with the Superfund process and the work that was to begin during the RI for Northside. A second purpose for that meeting was to explain the surface cleanup and RI work that had been done at Enviro-Chem. After the RIs were completed for both sites, a joint public meeting was held in May 1986 to explain the results of the RIs. All comments that were received after this public meeting were reviewed and considered in the preparation of the FSs. A Fact Sheet updating the progress on the FSs was sent to all groups and individuals on the mailing list in Fall 1986. When the FSs were completed in December 1986, another public meeting was held. A seventy-eight day public comment period was available during which comments on both FSs and the CAA were accepted.

Local residents are extremely concerned that a permanent remedy be implemented as soon as possible at the sites. U.S. EPA has met with a local environmental group to discuss issues related to the sites.

The responsiveness summary is attached.

XII. Deletion from the NPL

Upon implementation of the selected remedy, ECC/NSL will be probably classified as Long Term Response.

Table 1

WATER QUALITY CRITERIA APPLICABLE TO TREATED LEACHATE AND GROUND WATER DISCHARGE FOR RECOMMENDED ALTERNATIVE

	Average Leachate Concentration (ug/l)	Average Ground Water[h] Concentration (ug/l)	Stream Criteria (ug/l) One-Tenth 96 hr LC[d]	Stream Criteria: Protection of Aquatic Life[e] Acute	Stream Criteria: Protection of Aquatic Life[e] Chronic	Stream Criteria: Consumption of Aquatic Organisms[e]	Drinking Water Standards (ug/l): Maximum Contaminant Levels[f] (MCLs)	Drinking Water Standards: AWQC Drinking Water[g] Only	Drinking Water Standards: Maximum Contaminant Level Goals (MCLGs)
1,1,1-Trichloroethane	1	2,300	5,280	18,000°	-	1,030,000[a]	200	19,000[a]	200
1,1,2-Trichloroethane	-	1.5	9,400	18,000°	9,400°	41.8[b]	(-)	0.6[b]	-
Chloroform	-	11	-	28,900°	1,240°	15.7[b]	100[m]	0.19[b]	-
Benzene	106	104[i]	2,440	5,300°	-	40[b]	5	0.67[b]	0
Ethylbenzene	101	350	4,230	32,000°	-	3,280[a]	(-)	2,400[a]	680[j]
Methylene Chloride	1,250	5,900	19,300	-	-	15.7[b]	(-)	0.19[b]	-
1,1-Dichloroethene	3	3[i]	-	30,300[a]	-	1.85[b]	7	0.033[b]	7
Trichloroethene	1	5,800	4,020	45,000°	-	80.7[b]	5	2.8[b]	0
Tetrachloroethene	-	230	1,840	5,280°	840°	8.85[b]	-[n]	0.8[b]	-[n]
Toluene	26	1,800	3,400	17,500	-	424,000	-	15,000[b]	2,000[j]
Phenol	149	4,400	570	10,200	2,560°	769,000[a]	(-)	3,500[a]	-
4-Chloro-3-Methyl Phenol	62	-[i]	1.0	30°	-	-	-	3,000	-
Bis(2-Ethyl Hexyl) Phthalate	181	11	-	P	P	50,000	(-)	21,000[a]	-

	Average Leachate Concentration (ug/l)	Average Ground Water Concentration (ug/l)	Stream Standards: One-Tenth 96 hr LC[d]	Stream Standards: Protection of Aquatic Life[e] Acute	Stream Standards: Protection of Aquatic Life[e] Chronic	Stream Standards: Consumption of Aquatic Organisms	Drinking Water Standards (ug/l): Maximum Contaminant Levels[f] (MCLs)	Drinking Water Standards (ug/l): AWQC Drinking Water[g] Only	Drinking Water Standards (ug/l): Maximum Contaminant Level Goals (MCLGs)
Vinyl Chloride	-	18	-	-	-	525	2	2[b]	0
1,2 - Dichloroethane	-	-	-	48,000	2,000	243	5	0.94[b]	0
Di-n-butyl Phthalate	12	9	-	p	p	154,000[a]	(-)	44,000[a]	-
Diethyl Phthalate	33	7	-	52,100[p]	p	1,800,000[a]	(-)	434,000[a]	-
Dimethyl Phthalate	-	7	-	33,000[p]	p	2,900,000[a]	(-)	350,000[a]	-
Napthalene	20	28[i]	15,000	2,300	620	-	(-)	-	-
Arsenic	6	25	-	360	190	0.0175	50	0.0025[b]	50[j]
Chromium	18	5	-	16	11	3,433,000	50[k]	50	120[k]
Copper	33	4	-	42[c]	26[c]	-	1,000[l]	1,000	1,300[j]
Cyanide	-	15	-	22	5.2	-	-	200[a]	-
Iron	32,600	2,550	-	-	1,000	-	300[l]	-	-
Lead	45	22	-	262[c]	10[c]	-	50	50[a]	20[j]
Nickel	76	71	-	3,700[c]	192[c]	100	-	15.4[a]	-
Zinc	123	31	-	687[c]	47[c]	-	5,000	5,000	-

[a] Based on toxicity concentration.

[b] Based on carcinogenic protection.

[c] Contaminant concentration based on water hardness of 250mg/l $CaCO_3$ equivalent.

[d] Based on published 96-hour median lethal concentration, (Verschueren, 1983). Use of one-tenth of the 96-hour median lethal concentration is based on State of Indiana Water Quality Standards, 330 IAC 1-1.

[e] 1980 Federal Ambient Water Quality Criteria, as revised in 50FR 30784, July 29, 1985.

[f] Parentheses indicate that EPA must promulgate an MCL for that contaminant under the Safe Drinking Water Act Amendments of 1986.

[g] 1980 Federal Ambient Water Quality Criteria.

[h] Average ground water concentration includes projected ground water concentration of selected contaminants in till unit at ECC (see ECC RI Report, Chapter 5 (March 14, 1986) and existing ground water concentrations at NSL perimeter (see NSL FS Report, Appendix A).

[i] Concentration not estimated for ground water beneath ECC. Concentration represents NSL ground water concentrations only.

[j] Proposed Maximum Contaminant Level Goal

[k] Total Chromium

[l] The MCLs for copper and iron are secondary MCLs, based primarily upon aesthetic qualities of water.

[m] The MCL for chloroform is a final MCL for total trihalomethanes.

[n] The MCL and MCLG for tetrachloroethene are expected to be proposed in December 1987 and to become final in June 1988.

[o] These are lowest observed effects levels (LOELs).

[p] The protection of aquatic life criteria for phthalates, as a class, are 940 ug/l (acute LOEL) and 3 ug/l (chronic LOEL).

____ Underline designates the lowest stream criteria.

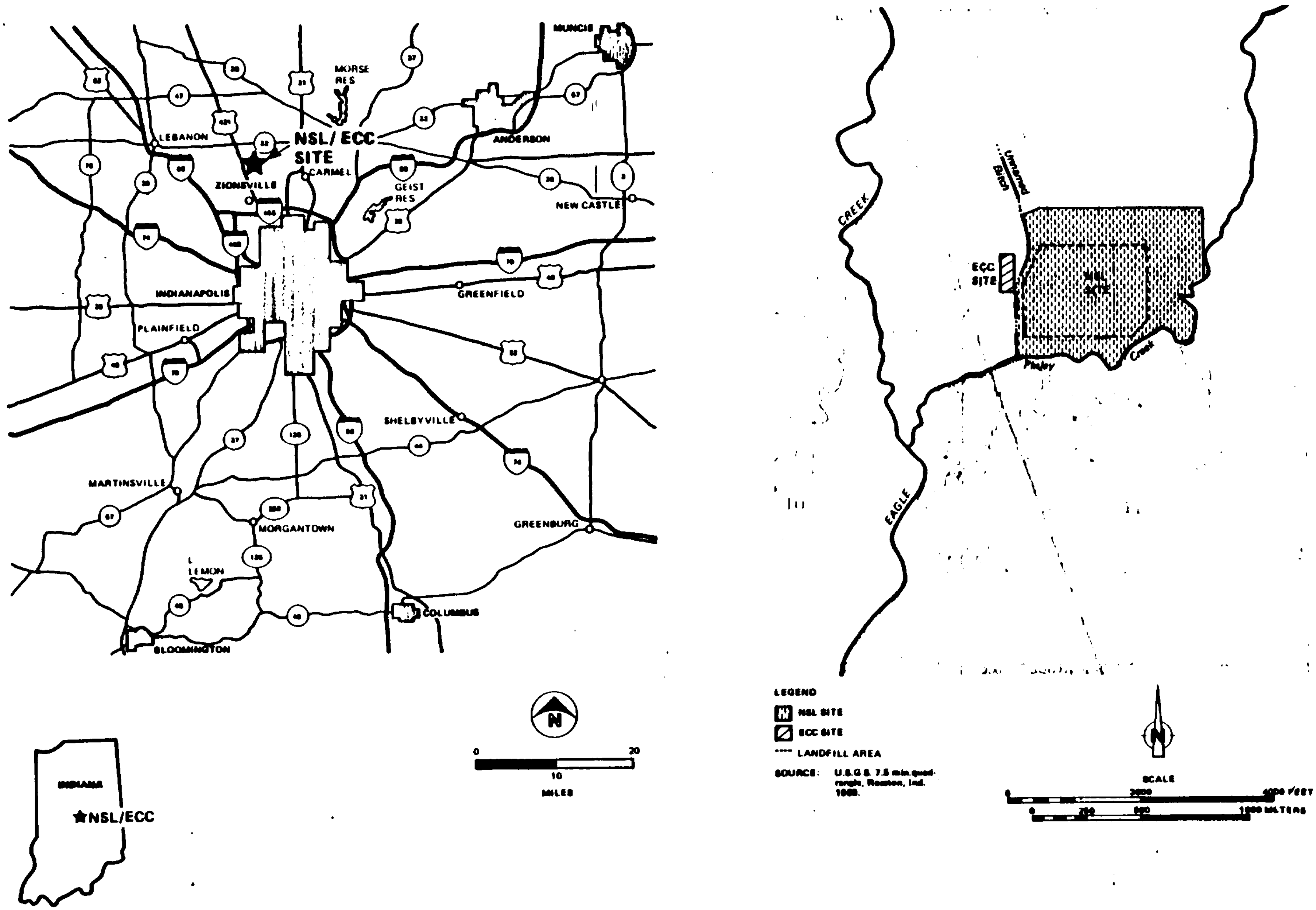

FIGURE 1
ECC/NSL ROD

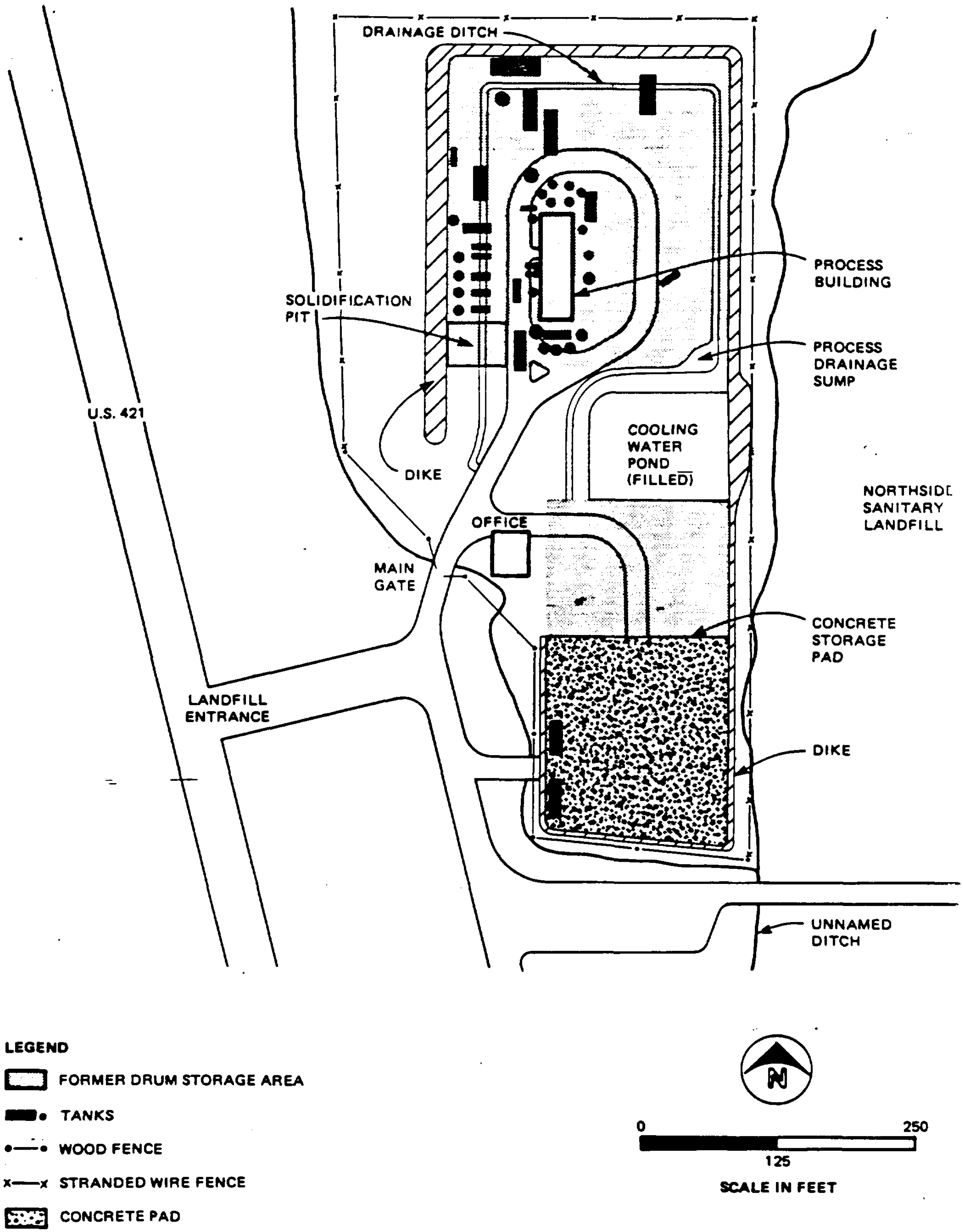

FIGURE 2
ECC/NSL ROD

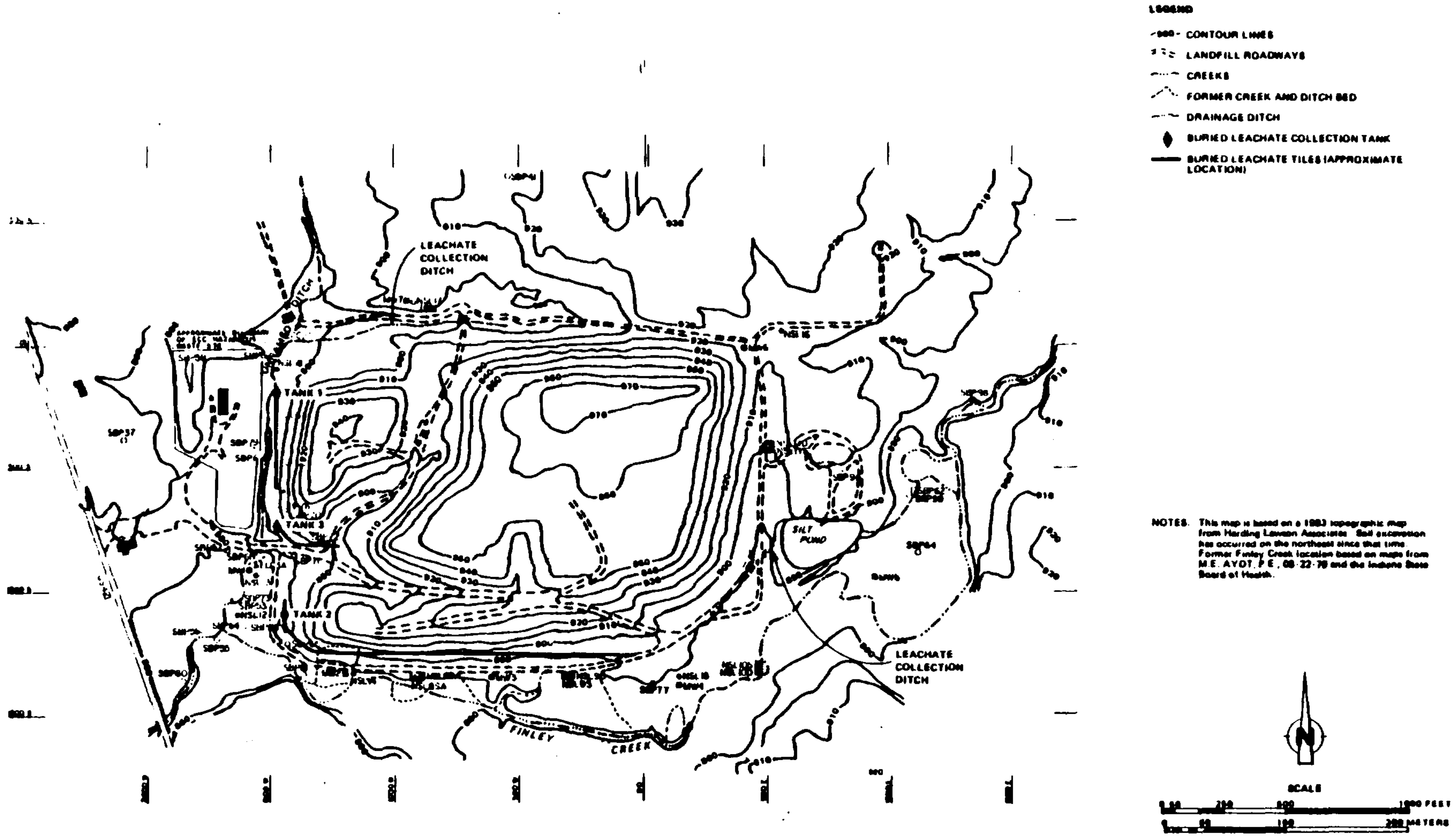

FIGURE 3
ECC/NSL ROD

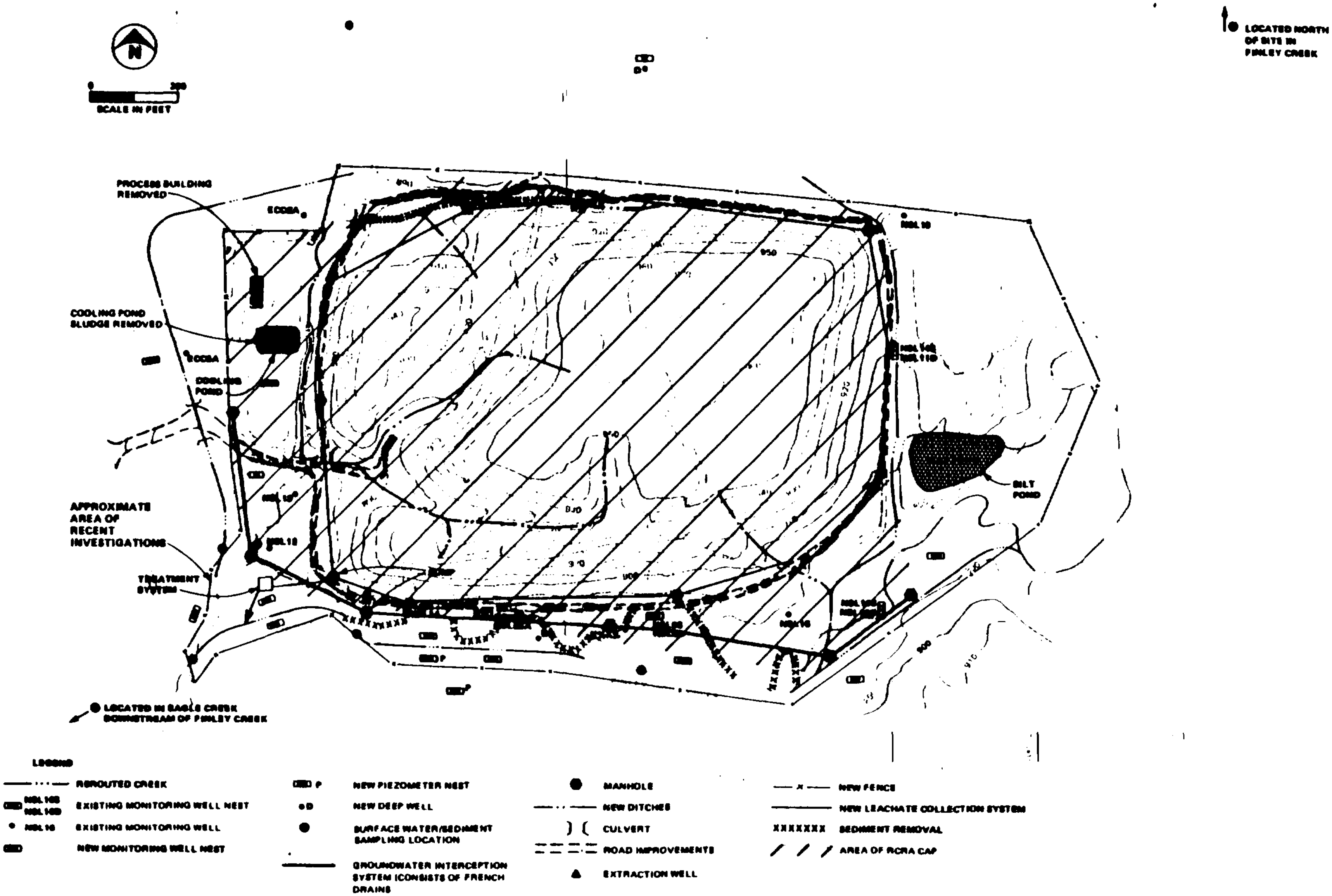

FIGURE 4
ECC/NSL ROD

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XIII. Enforcement

A. ECC

1. Federal

On November 9, 1983, a Partial Consent Decree was entered into by 254 companies, hereinafter the "ECC Settlors." Under the terms of the Partial Consent Decree, the ECC Settlors agreed to undertake surface cleanup activities at the ECC site.

Work under the Partial Consent Decree was substantially completed on August 8, 1984. On August 1, 1984, U.S. EPA approved funding to undertake further surface cleanup work, some of which was reimbursed by the November 1983, Partial Consent Decree.

2. State

No State court enforcement activities involve ECC at this time.

B. NSL

1. Federal

No Federal CERCLA enforcement activities involve NSL at the present time.

2. State

In May 1983, the EMB issued a Notice of Violations, Compliance Order and Hearing to NSL, alleging numerous violations of the Indiana Environmental Management Act, and associated rules and ordered NSL to undertake certain remedial measures. The State was joined in this action by several residents living within 1.5 miles of NSL in September 1983. The hearing began in January 1984, and the hearing officer released his Recommended Final Order in November 1986. In January 1987 the EMB adopted the hearing officer's recommended final order. Among the stipulations of this order are:

- NSL shall install and maintain a functioning leachate collection system at the base of the trash around the entire perimeter of the landfill;

- NSL shall install a slurry wall (hydraulic cut-off barrier), or undertake construction utilizing a different technology, with the object being to prevent contaminated ground water from migrating off-site;

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- NSL shall conduct ground water monitoring pursuant to RCRA monitoring protocol;
- NSL shall accept no further solid waste except that amount needed to adequately contour the site.

NSL has appealed the decision of the EMB. Venue for the appeal is Tippecanoe County. A hearing date has been set in December to hear the appeal.

Federal action will be taken to obtain closure and, if necessary, to implement the remedy at NSL.

C. Both Sites

There are three Steering Committees for the two sites representing over 1000 potentially responsible parties. They are: the ECC Settlors, the ECC Non-Settlors (those potentially responsible parties who either refused to sign the November 1983 Consent Decree, or whose identity was not known at that time), and the NSL Steering Committee. In addition, the landfill owner represents himself as a separate entity.

Technical meetings to discuss the Steering Committees' concerns regarding the proposed remedy have occurred with these groups since January 1987.

U.S. EPA has split the costs of the combined cleanup into those that apply to ECC and those that apply to NSL. In addition, U.S. EPA will be seeking at least $3 million in past costs on the ECC site. Apportioning the costs for the ECC portion of the settlement will be difficult, because the ECC Settlors, under the November 1983 Consent Decree, have been released from surface costs down to four feet, as well as half the RI/FS costs.